MONTHLY WEATHER REVIEW,

MAY, 1874.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

I.—INTRODUCTORY.

This month has not been distinguished by any general storm of unusual severity, but numerous local thunder and hail-storms have been reported. The presence in the southeastern quarter of the United States of several large areas of high barometer has apparently produced a considerable rain-fall on the immediate Atlantic coast, with a decided deficiency in the interior of the country.

II.—BAROMETRIC PRESSURE.

(1.) *In General.*—The average distribution of atmospheric pressure for the month of May is shown on the accompanying chart, from which it appears that the region of highest barometer includes the South Atlantic and Gulf States, while the areas of lowest pressure are respectively in the Missouri Valley and the St. Lawrence Valley; the barometric pressure in Oregon is notably higher than in New England, a feature which accords with the general law that pressures average higher on the eastern than on the western borders of oceans.

(2.) *Areas of High Barometer.*—Nine well-marked areas of high barometer have been traced during the month, five of which appear to have passed, without losing their identity, from the Pacific coast southeastward to the Atlantic.

(3.) *Areas of Low Barometer.*—Eight areas of low barometer, forming the centres of considerable atmospheric disturbances, have passed over the region covered by our stations, and their central tracks are shown on Chart No. I. In general the paths of these storm-tracts lie considerably further north than do those of May, 1873; their courses being almost due eastward; while those of last year were more frequently northeastward.

No. I. The course of this depression is traced, in the review for April, backwards to the Pacific coast. It was, on the 1st of May, central in Nebraska, and quite steep barometric gradients extended from that region to the Upper Lakes and to the Gulf States. The storm-centre which had been moving with extreme slowness during several preceding days, apparently moved southward to the western plains until, on the morning of the 3d, it was central in eastern Kansas. A very extensive area of cold air and high barometer had meanwhile pressed southeastward over the Lake region to the Middle

Atlantic coast, the presence of which evidently materially modified the subsequent movements of the storm-centre. The latter moved in consequence almost due eastward, passing over Tennessee and Kentucky on the 4th, on which date the barometer at the centre was fully three-tenths of an inch higher than it had been on the previous day; but on passing over the Blue Ridge the central depression again increased, until it had passed over Cape Hatteras beyond our cognizance.

No. II. This depression is first indicated by reports from the extreme Northwest on the 6th, and on the 7th while it was still in the upper Missouri valley, a very extensive area of high barometer developed over the Gulf and South Atlantic States. On the morning of the 8th, a quite steep barometric gradient prevailed over the entire country from Texas and Michigan to Manitoba, and south or southwest gales prevailed from Colorado and Wyoming to Wisconsin and Illinois. The barometer continued to rise during the day throughout almost the entire Atlantic and Gulf coast States, while it fell rapidly over the entire country north of the Ohio and Missouri rivers. This unusual state of things continued during the 9th and 10th, and on the morning of the 11th, the barometric depression was still central in Minnesota and Dakota; during the subsequent day, however, it slowly moved eastward into Canada and was lost to further observation, having apparently been separated into at least two portions, one of which is No. III of the accompanying chart.

No. IV. This disturbance was first indicated by falling barometer and rain reported from Santa Fé on the 12th. The exact position of the area of greatest disturbance can scarcely be given until the morning of the 14th, at which time it was central in Kansas, whence it moved slowly eastward over Illinois on the 15th, Lake Erie on the 16th, and the St. Lawrence valley on the 17th. During the middle portion of its course the barometric gradients were very slight, but increased decidedly when the disturbance was in the Ohio valley.

No. V. The area of high barometer, that on the 17th covered the Southern States, gave rise to warm southerly winds, that encountering an area of cold air that pressed southeastward over the Upper Lake region, initiated a precipitation that gave rise to the depression numbered V, which may be considered in some sort as a remnant of No. IV. This area of low barometer passed slowly eastward over New England, and turning northeastward over Maine on the 19th, disappeared in the Gulf of St. Lawrence; it was accompanied by numerous light rains in the Middle and Eastern States.

No. VI. This depression probably passed over the Rocky Mountains on the 17th, and followed immediately in the train of an area of high pressure. Rain was reported from Minnesota on the afternoon of the 18th, and the lowest pressure was central in the southern portion of that State on the morning of the 19th. Its course continued slowly southeastward over Lake Erie on the morning of the 20th, and thence over New York on the 21st, and Maine on the 22d.

No. VII. An extensive area of high barometer separated the preceding storm-centre while it was in Maine, from No. VII, which, on the morning of the 22d, was in Dakota and Manitoba. In twenty-four hours this depression moved somewhat to the northeast, and on the 24th it developed rapidly as it moved over the Upper Lakes. On the morning of the 25th the depression was central over Lake Huron, and rain prevailed throughout the Middle and Eastern States. During the day this disturbance moved eastward

and northeastward, and was accompanied on its south and east sides by unusually numerous local thunder and hail-storms, of which a special report is in preparation.

No. VIII. This disturbance probably originated on the Plains west of the Mississippi, up which an easterly wind had, for several days, been blowing, in consequence of the high pressure then existing in the South Atlantic States. The greatest depression was on the morning of the 27th, in Dakota, on the afternoon of which date there were presented in that region, in a marked degree, a great contrast of cold north and hot south winds, the temperature ranging from 90 to 95 degrees from Lake Superior to Nebraska, with numerous local thunder-storms, while 57 degrees was reported from Pembina and Fort Garry. This conflict of north and south winds, with low barometer, continued for forty-eight hours, when an area of high barometer advanced southeastward toward Lake Superior, and on the 29th and 30th the original disturbance died away, and disappeared in Canada.

(4.) *Local Storms.*—By the term local storm will be included, in this section, every recorded case of thunder, lightning, or hail. The electrical phenomena attending these storms will be considered in a subsequent paragraph; but, so far as these storms are connected with the areas of low barometer, their distribution will be apparent from the following table of local storm frequency:

Regions reporting 1, 2, or 3 local storms during the month, at the Signal Service Stations:

Ohio Valley.
Middle Atlantic Coast.
New England.
New York.
Upper Lake region.
Upper Mississippi Valley.

Regions reporting from 4 to 8 local storms during the month, at the Signal Service Stations:

South Atlantic States.
Blue Ridge.
Tennessee.
Gulf States.
Missouri Valley.
Colorado.
New Mexico.

The most remarkable series of thunder and hail-storms is reported from Pike's Peak, where they have occurred on 12 different days, mostly during the last half of the month.

III.—ATMOSPHERIC TEMPERATURE.

(1.) *In General*—The general distribution of the temperature is apparent from the accompanying chart of isothermal lines and the table of comparative temperatures. For the entire Atlantic States a slight deficiency is reported, but in the interior of the country a decided excess.

(2.) *Frosts.*—No remarkably severe frosts have been reported during the month, but slight frosts have been quite frequent in the Northwest, the Ohio Valley, the Lower Lake region and New England. The most extensive frosts occurred on the 7th in North Carolina, Virginia, Pennsylvania, New York and Ohio; on the 18th in Illinois, Iowa, Michigan, Wisconsin, Indiana and Ohio; on the 19th in Ohio, Indiana, Virginia, North Carolina, New York and Maine; on the 23d in Pennsylvania, Virginia and New Jersey.

IV.—PRECIPITATION.

(1.) *In General.*—By the isohyetal lines on the accompanying chart, it will be seen that the rain-fall during May has been distributed in a manner remarkably complementary to that of the preceding one, a great deficiency being reported from the Mississippi Valley and the entire Northern and Western sections, while a slight excess has prevailed in the South and East Atlantic States.

(2.) *Special Droughts.*—The long succession of 26 rainless days in some portions of the South Atlantic States has given rise to some complaints from limited regions in North Carolina, notwithstanding the large quantity of rain that has fallen on the coast. In the Tennessee and Ohio Valleys, Iowa, Indiana, Illinois and Minnesota, the month has been remarkably dry.

(3.) *Cloudy Days.*—The number of days entirely cloudy, as reported from the Signal Stations averages as follows:

5 on the Gulf Coast.
7 on the South Atlantic Coast.
8 on the Middle Atlantic Coast.
12 on the East Atlantic Coast.
5 in the Lower Mississippi Valley.
5 in the Ohio Valley.
5 in the Upper Mississippi Valley.
8 in the Lower Missouri Valley.
7 in the Lake Region.

(4.) *Rainy Days.*—The number of days in which rain fell, as reported from the Signal Service Stations only, is as follows:

3 on the Gulf Coast.
10 on the South Atlantic Coast.
8 on the Middle Atlantic Coast.
8 in the Upper Mississippi Valley.
10 in the Lake region.
6 on the East Atlantic Coast.
3 in the Lower Mississippi Valley.
7 in the Ohio Valley.
9 in the Lower Missouri Valley.
8 over the Blue Ridge and Alleghanies.

(5.) *Special Rains.*—Remarkably heavy rain-falls occurred—

On the 27th at Galveston.
On the 11th at Clarksville, Texas.
On the 25th at Brookhaven, Miss.
On the 25th at Sugar Island, Mich.
On the 20th at Brownsville, Penn.

Severe hail-storms appear to have been unusually frequent. The most instructive report on the subject comes from the summit of Pike's Peak, where, on the 14th, large balls of hail fell, composed of soft white snow, without any nucleus. Remarkably large hail is reported from Pennsylvania on the 20th, and from Mississippi on the 25th.

V.—HUMIDITY.

In the following table a synoptical view is given of the average per cent. of relative humidity for the several sections of the country:

For the Texas coast, 72; for the New Jersey coast, 74; for the South Atlantic coast, 68; for the interior of the Middle Atlantic States, 62; for the New England coast, 65; for the southern shores of the Lower Lake region, 62; for the Upper Lake region, 65; for the lower Mississippi valley, 60; for the Ohio and Tennessee valleys, 56; for the upper Mississippi valley, 56; for the lower Missouri valley, 56; for the extreme Northwest, 62; for Cheyenne and Denver, 42; for Salt Lake City and Colorado Springs, 40; for Santa Fé, 23; for summit of Pike's Peak,* 69; for summit of Mount Washington,* 86.

* These figures have not been corrected for the altitude of these stations, which respectively are 14,216 and 6,285.

Reports from the interior of Virginia, from Wisconsin, Iowa and Indiana, state that in its relation to agriculture the month has been very dry and hot, but that cool nights and heavy dews have prevailed.

VI.—THE WINDS.

(1.) *In general.*—The winds most frequently observed are shown by the arrows on the accompanying chart, from which it is evident that southeasterly winds predominated on the Gulf and South Atlantic coasts, but southerly winds in the valley of the Mississippi river and its tributaries. Westerly winds have predominated in New England, and west to northwest winds over the Lake region. Northwest winds have prevailed at the summits of Mt. Washington and Pike's Peak.

(2.) *Strong winds.*—The maxima of hourly velocity of winds recorded at each Signal station, without regard to the direction or the time of day, are as follows: Mt. Washington, 88 miles; Pike's Peak, 60 miles; St. Paul, 50 miles; Keokuk, Omaha, Denver, Indianola and New York, 48 miles; Breckenridge, Duluth, Fort Sully, Santa Fé, Philadelphia, Toledo, Squan Beach and Long Branch, 45 miles.

In general the maximum hourly velocity has been least throughout the Atlantic and Gulf States, and greatest in the Northwest, where numerous violent local wind-storms have occurred.

The dates on which strong winds were most generally observed were—May 1st, in the Western Territories and Northwest; May 8th, in the Western Territories and Northwest; May 29th, in the Western Territories and Northwest; May 25th, in the Lake region, Middle and Eastern States; May 11th, on the Middle Atlantic coast.

VII.—VERIFICATION OF PREDICTIONS.

(1.) *Probabilities.*—The critical comparison between the separate items of the published tri-daily probabilities and the subsequent weather reports, shows that on the average, during the month, 84½ per cent. of the predictions have been well verified.

VIII.—RIVERS AND NAVIGATION.

(1.) *Opening of Harbors, &c.*—The last traces of ice in harbors and lakes are reported at Traverse City, Michigan, on the 3d; at Mt. Desert, Maine, on the 6th; at Buffalo and Duluth on the 9th. The Erie Canal was opened on the 5th. An unusually high tide is reported at Indianola, Texas, on the 29th. Navigation is reported as beginning at Duluth on the 4th, and Traverse City on the 7th.

(2.) *Heights of Rivers.*—The general condition of the rivers will be found from the accompanying table, which gives the dates of the maximum and minimum heights of water:

HEIGHT OF RIVERS ABOVE LOW WATER MARK.

STATIONS.	HIGHEST.		LOWEST.		STATIONS.	HIGHEST.		LOWEST.	
	DATE. MAY.	HEIGHT. Feet. Inch.	DATE. MAY.	HEIGHT. Feet. Inch.		DATE. MAY.	HEIGHT. Feet. Inch.	DATE. MAY.	HEIGHT. Feet. Inch.
MISSOURI.					*RED RIVER.*				
Yankton	19	12 4	13	8 11	Shreveport	1	30 3	21–22	23 2
Omaha	22	7 1	13	4 4					
Plattsmouth	23	2 0	13	1 2†	*CUMBERLAND.*				
St. Joseph	24	6 4	8-9 15-17	3 3	Nashville	1	34 2	31	3 6
Leavenworth	25	3 9	9	1 4					
Kansas City	25	9 1	8–15	6 7	*OHIO.*				
Lexington	26	6 4	22	3 4					
Brunswick	27	4 9	21–22	1 9	Pittsburgh	1	13 2	31	4 0
Boonville	5	8 6	23	4 9	Marietta	1	25 7	28	4 10
Jefferson City	5	8 6	23	5 0	Cincinnati	1	46 0	31	9 1
Hermann	5	7 10	23	4 10	Louisville	3	22 9	31	4 8
					Evansville	5	38 7	31	5 7
MISSISSIPPI.					Paducah	1	44 10	30	8 6
St. Paul	1	8 9	22	6 0	*ALLEGHENY.*				
La Crosse	10	8 5	31	5 3					
Le Claire	15–16	6 6	28	5 2	Freeport	1	5 5	25	1 5†
Dubuque	13–17	11 5	31	8 7					
Davenport	16–17	8 2	31	6 0	*YOUGHIOGHENY.*				
Keokuk	19	8 3	31	6 6					
Warsaw	17–20	8 11	31	7 1	Confluence	1	5 5	31	0 1†
St. Louis	7	17 5	28	13 5					
Cairo	1	45 8	30–31	14 8	*MONONGAHELA.*				
Memphis	1–4	34 10	31	14 0					
Helena	11	45 10	30	26 8	Morgantown	1	7 2	29–31	0 10
Vicksburg	1–5	45 8	31	43 1	New Geneva	1	8 4	29	2 5†
New Orleans	2	1 6*	26–31	2 7*	Brownsville	1	10 6	28–29	1 2†

* Below high water mark. † Below bench mark.

(3.) *Special River Floods.*—The river flood of most importance during this month has been that which devastated the Valleys of the Lower Mississippi, Arkansas, White, Red and other rivers. The crevasses on the Mississippi may be classified as follows: Between Memphis and the Louisiana State line were four large crevasses and several smaller ones, opening into the States of Mississippi, Arkansas and Tennessee. South of the Louisiana State line, and almost exclusively opening into that State, were fourteen large and nine small crevasses. The total length of breaks in levees exceeds twelve miles. The total extent of bottom lands overflowed exceeds 25,000 square miles. The overflowed land in Louisiana was confined to a region 20 to 50 miles broad, immediately adjoining the western bank of the river, and spreading out over at least one half of the Delta properly so called; the entire length of the inundated region, in a north and south direction, being nearly 400 miles.

IX.—WATER TEMPERATURES.

The extremes of the temperature of the water, as observed at the Signal Service Stations, are given in the table on the accompanying chart No. III.

X.—ELECTRICAL PHENOMENA.

(1.) *Lightning.*—The general distribution of atmospheric electricity, so far as it accompanies local thunder-storms, has been given in a previous section. The relation of the phenomena of lightning and thunder-storms in general to the general areas of low pressure may be seen from the following statement:

The area of low pressure, No. VII, central on the morning of the 25th, near Lake Huron, had moved by the morning of the 26th to a position near Quebec, the central barometric pressure having diminished decidedly during the 25th. Local thunder-storms are reported on the afternoon of the 25th from nearly every station in the Gulf States, Tennessee, Virginia, the Middle Atlantic coast, southern New England and Lake Ontario.

On the 24th, area No. VII passed over the Upper Lake region. On the afternoon of that day thunder-storms were reported from nearly every station in New Mexico, Colorado, northern Texas, the upper Mississippi valley, the Upper Lake region and Lake Erie.

On the 20th, area No. VI passed over the Lower Lake region, and on the same day thunder-storms were reported from numerous stations between the Blue Ridge and Middle Atlantic coast.

On the 21st, low barometer No. VI passed over New England, and numerous storms were reported from the Eastern Gulf and South Atlantic States and southern portions of New England and the Middle States.

Of special electrical phenomena, the record of the station on the summit of Pike's Peak affords remarkable instances. Those noted at that place on the 24th are among the most instructive and interesting on record. The summit of the mountain was evidently highly charged, and discharges were continually given off from every prominent point into the atmosphere and to the adjacent clouds, the only position of safety being within the stone hut occupied by the observers.

(2.) *Auroras.*—An unusually large number of auroras has been reported during the month, but those that have been seen were extremely faint and insignificant. They were observed on the following dates: 1, 3, 4, 5, 11, 12, 13, 14, 15, 17, 18, 20, 21, 24, 25, 26 27.

(3.) *Ground currents.*—The phenomena of ground currents on telegraphic wires, common as it is on the lines running up Mt. Washington and Pike's Peak, was especially noticed at the latter station on the 20th and 24th.

XI.—OPTICAL PHENOMENA.

Solar and lunar halos have been very frequently reported, but appear not to have possessed such interesting characteristics as those of April.

The lunar halo of the 22d was very generally visible throughout the Northwest, the Lake region and the Ohio and Tennessee valleys. A solar halo was recorded on the 23d at numerous stations in the Middle Atlantic States and in New York, and a lunar halo in the evening of the same day in the Middle and Eastern States.

XII.—MISCELLANEOUS.

(1.) *Botanical Phenomena.*—Among the earlier phenomena of spring vegetation we note the budding of forest trees at Colorado Springs on the 16th, the blooming of cherry trees at Rochester on the 12th. For Lunenburg, Massachusetts, a table has been furnished by the volunteer observer, giving the date of blooming of apple trees for 77 years past; the earliest recorded date is the 9th of May; the mean date is the 21st of May; the latest the 3d of June. The date for the current year is the 29th of May.

(2.) *Zoological Phenomena.*—The early appearance of insects injurious to vegetation is very generally noted, among which may be mentioned, in West Virginia and Kentucky, the so-called Colorado Potato Bug. In Western New York, myriads of small flies.

(3.) *Prairie and Forest Fires.*—These have been reported from the vicinity of Alpena, Breckenridge, Buffalo, Denver, Duluth, Keokuk, Pike's Peak, Rochester, and Vicksburg.

(4.) *Meteors.*—Unusually bright meteors have been reported on the following dates: The 8th, 10th, 14th, 16th, 17th, 18th, 19th, 20th, 21st, and 25th

(5.) *Polar Bands.*—This peculiar arrangement of cirrus clouds was noticed on the 1st at Omaha; on the 2d at Key West, Toledo and Sandy Hook; on the 3d, at Atlantic City; on the 7th and 20th, at Key West; on the 22d, at Keokuk; on the 27th, at Atlantic City, and on the 29th, at Savannah.

(6.) *Earthquakes.*—The only earthquake phenomena that has been reported, consists in occasional and spasmodic repetitions of the shocks that were so frequently observed in the western portion of North Carolina in March.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

Albert J. Myer

Brig. Gen. (Bvt. Assg^{l},) Chief Signal Officer, U. S. A.

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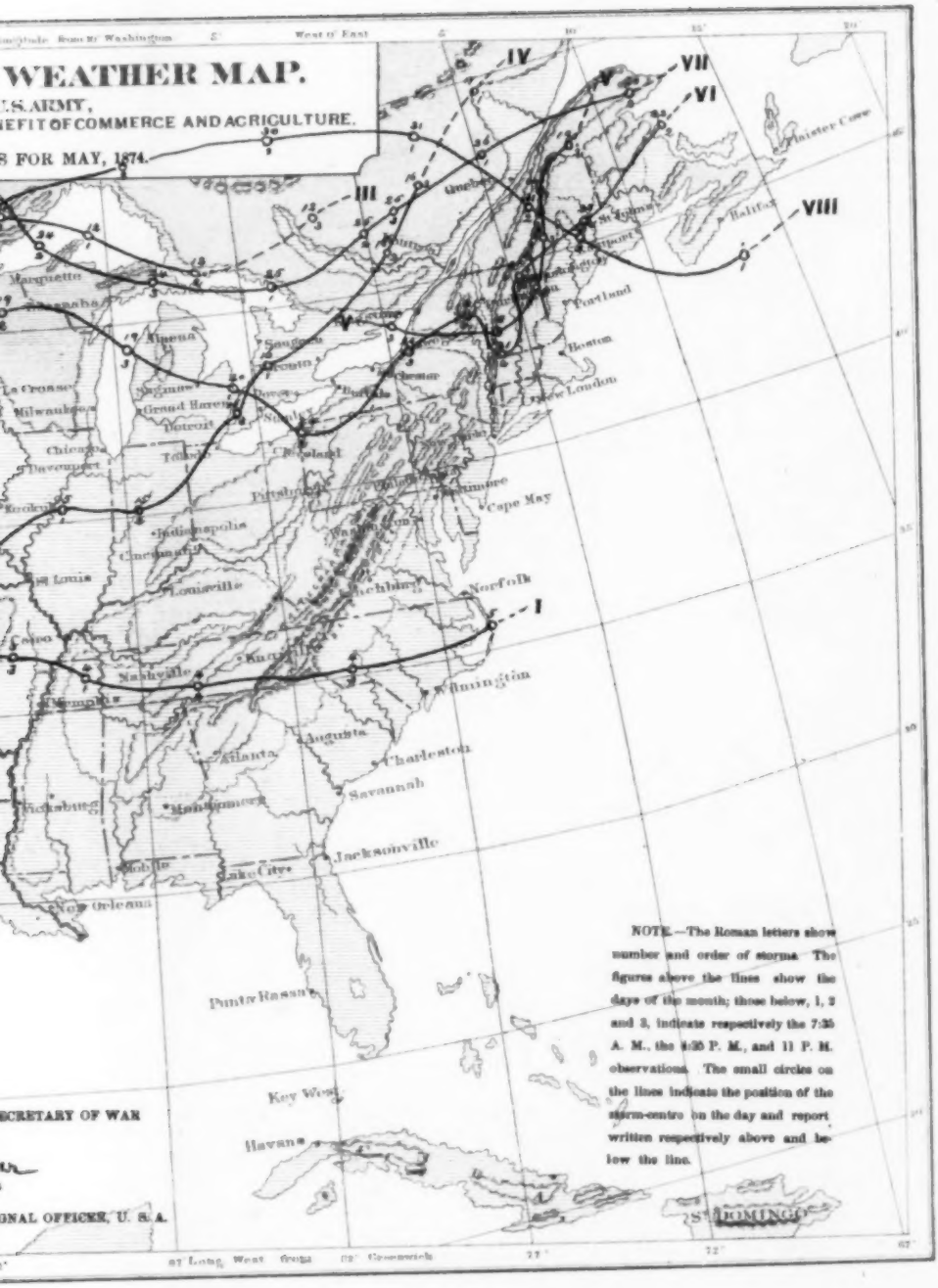
No. I.


WEATHER MAP.
U.S. ARMY,
NEFIT OF COMMERCE AND AGRICULTURE.
8 FOR MAY, 1874.
I
II
III
IV
V
VI
VII
VIII
Marquette
La Crosse
Milwaukee
Grand Haven
Detroit
Chicago
Davenport
Rockford
Toledo
Cleveland
Pittsburg
Baltimore
Cape May
Indianapolis
Cincinnati
Louisville
Richmond
Norfolk
St. Louis
Cairo
Nashville
Memphis
Wilmington
Augusta
Atlanta
Charleston
Savannah
Montgomery
Jacksonville
Mobile
Lake City
New Orleans
Port au Prince
Key West
Havana
Portland
Boston
New London
Halifax
Minister Cove
ST. DOMINGO
SECRETARY OF WAR
ONAL OFFICES, U. S. A.
NOTE.—The Roman letters show number and order of storms. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7:35 A. M., the 4:35 P. M., and 11 P. M. observations. The small circles on the lines indicate the position of the storm-centre on the day and report written respectively above and below the line.

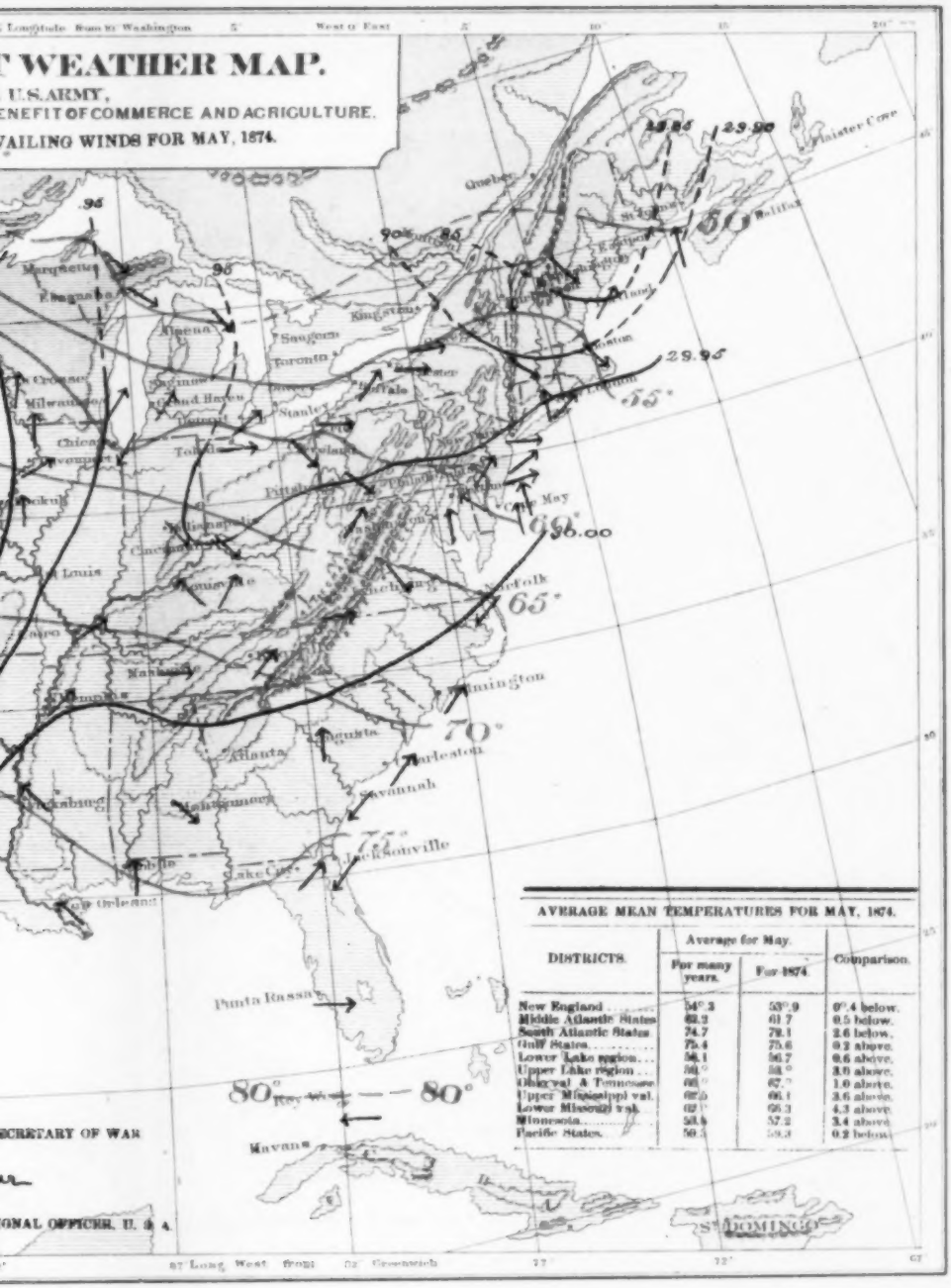
H. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

T WEATHER MAP.

U.S.ARMY,

ENEFIT OF COMMERCE AND AGRICULTURE.

AILING WINDS FOR MAY, 1874.



AVERAGE MEAN TEMPERATURES FOR MAY, 1874.

DISTRICTS.	Average for May.		Comparison.
	For many years.	For 1874.	
New England	54°.3	53°.9	0°.4 below.
Middle Atlantic States	62.2	61.7	0.5 below.
South Atlantic States	74.7	72.1	2.6 below.
Gulf States	75.4	75.6	0.2 above.
Lower Lake region	56.1	56.7	0.6 above.
Upper Lake region	50.°	53.°	3.0 above.
Ohio val. & Tennessee	66.°	67.°	1.0 above.
Upper Mississippi val.	62.5	66.1	3.6 above.
Lower Missouri val.	62.°	66.3	4.3 above.
Minnesota	53.5	57.2	3.4 above.
Pacific States	59.5	59.3	0.2 below.

ECRETARY OF WAR

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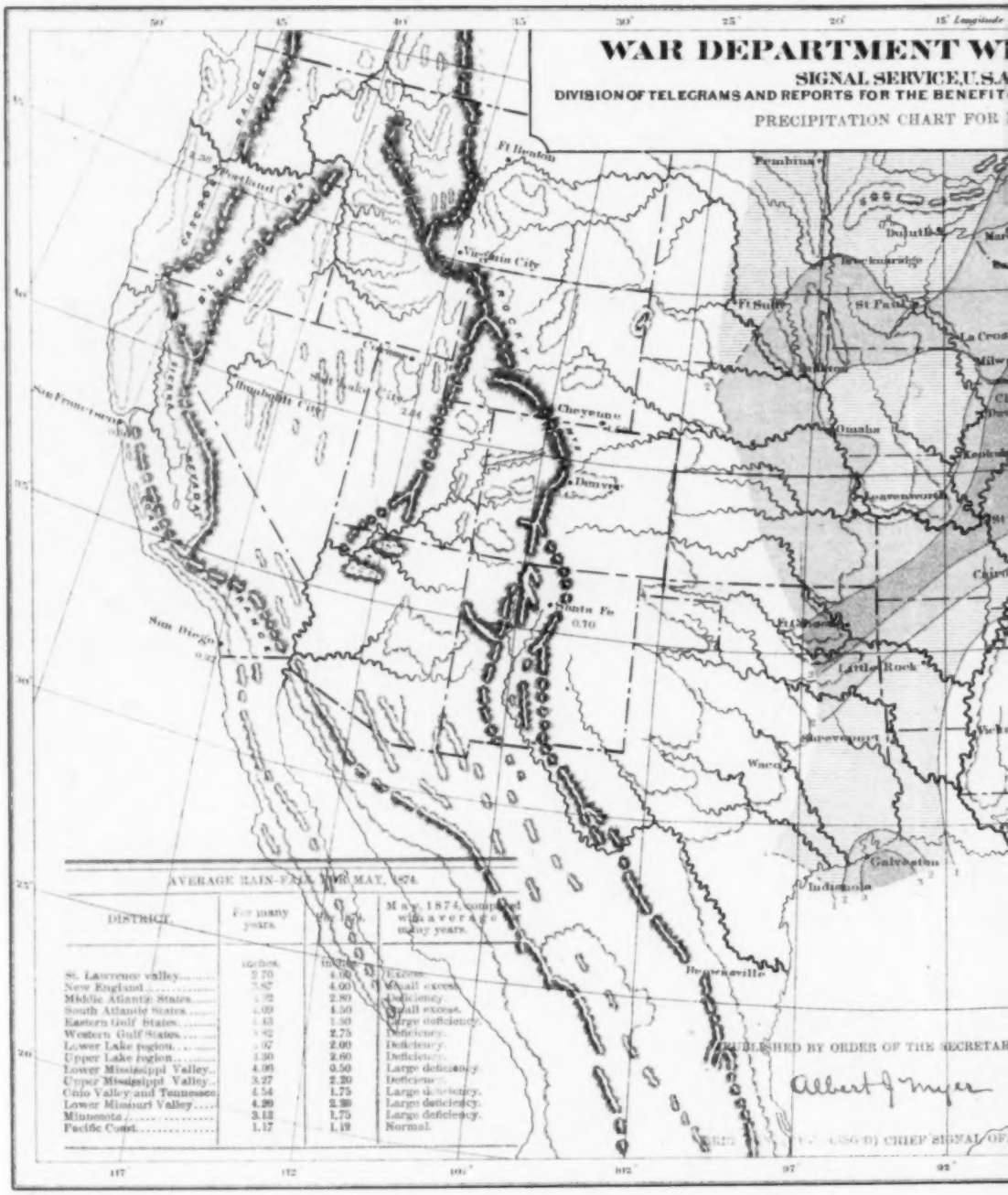
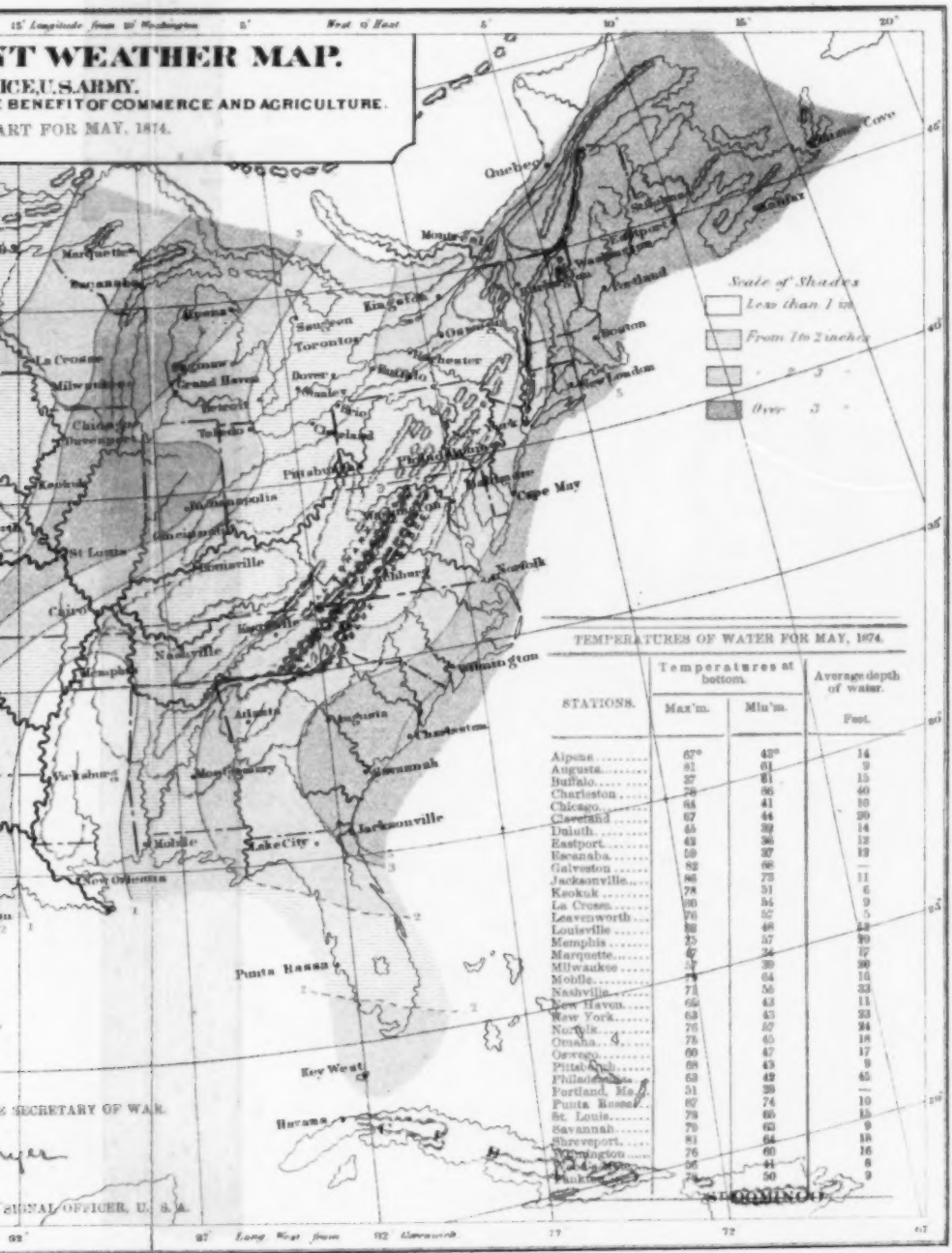

WAR DEPARTMENT W
SIGNAL SERVICE, U.S.A.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT
PRECIPITATION CHART FOR
Pembina
Duluth
Ft Benton
Virginia City
Ft Sully
St Paul
Cheyenne
Denver
Omaha
Leavenworth
Santa Fe
0.70
Little Rock
Galveston
Indianola
Brownsville
Albert J. Myer
AVERAGE RAIN-FALL FOR MAY, 1874.
DISTRICT
For many years.
For 1874.
May, 1874, compared with average of many years.
inches.
inches.
St. Lawrence valley 2.70 4.00 Excess.
New England 3.87 4.00 Small excess.
Middle Atlantic States 3.72 2.80 Deficiency.
South Atlantic States 4.09 4.50 Small excess.
Eastern Gulf States 4.43 1.50 Large deficiency.
Western Gulf States 3.82 2.75 Deficiency.
Lower Lake region 3.07 2.00 Deficiency.
Upper Lake region 4.30 2.60 Deficiency.
Lower Mississippi Valley 4.06 0.50 Large deficiency.
Upper Mississippi Valley 3.27 2.20 Deficiency.
Ohio Valley and Tennessee 4.54 1.75 Large deficiency.
Lower Missouri Valley 4.20 2.20 Large deficiency.
Minnesota 3.12 1.75 Large deficiency.
Pacific Coast 1.17 1.19 Normal.

T WEATHER MAP.

ICE, U.S.ARMY.

E BENEFIT OF COMMERCE AND AGRICULTURE.

ART FOR MAY, 1874.



TEMPERATURES OF WATER FOR MAY, 1874.

STATIONS.	Temperatures at bottom. Max'm.	Min'm.	Average depth of water. Feet.
Alpena	67°	45°	14
Augusta	81	61	9
Buffalo	57	41	15
Charleston	78	66	40
Chicago	64	41	10
Cleveland	67	44	20
Duluth	45	32	14
Eastport	43	36	12
Escanaba	59	37	12
Galveston	82	66	—
Jacksonville	86	73	11
Keokuk	78	51	6
La Crosse	60	34	9
Leavenworth	76	57	5
Louisville	82	48	20
Memphis	85	57	20
Marquette	57	34	17
Milwaukee	57	39	30
Mobile	78	64	16
Nashville	77	55	33
New Haven	66	43	11
New York	63	43	23
Norfolk	76	57	24
Omaha	75	45	18
Oswego	60	47	17
Pittsburgh	68	45	9
Philadelphia	63	42	45
Portland, Me.	51	39	—
Punta Rassa	87	74	10
St. Louis	79	60	15
Savannah	79	63	9
Shreveport	81	64	18
Washington	76	60	16
[illegible]	56	41	6
[illegible]	78	50	9

ST. DOMINGO

SECRETARY OF WAR.

SIGNAL OFFICER, U. S. A.

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